Addition Subtraction Method

Remember, we are solving a system of equations by finding out where the 2 equations are equal (the x is the same, and the y is the same ---> in other words, their "intersection point" on the graph)

Now we will look at the **addition-subtraction** method:

In order for us to determine where an intersection point is, we must determine where x and y are equal for the 2 equations or graphs. To do this, we must first solve for 1 variable (either x or y). ***When using the addition subtraction method, you are eliminating 1 variable, so you can solve for the other.*** *Once you know the value of one of the variables at the intersection point, you can solve for the other.*

EXAMPLE

Solve the following system of equations:

y = 10 - 4x AND 2x = y - 7

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EXAMPLE #1

Solve the following system of equations:

y = 10 - 4x AND 2x = y - 7

$y + 4x = 10$

$-y + 2x = -7$

$y + 4x = 10$

$+ -y + 2x = -7$

$\frac{6x}{6} = \frac{3}{6}$

$x = \frac{1}{2}$

$-y + 2x = -7$

$-y + 2\left(\frac{1}{2}\right) = -7$

$-y + 1 = -7$

$\frac{-y}{-1} = \frac{-8}{-1}$

$y = 8$

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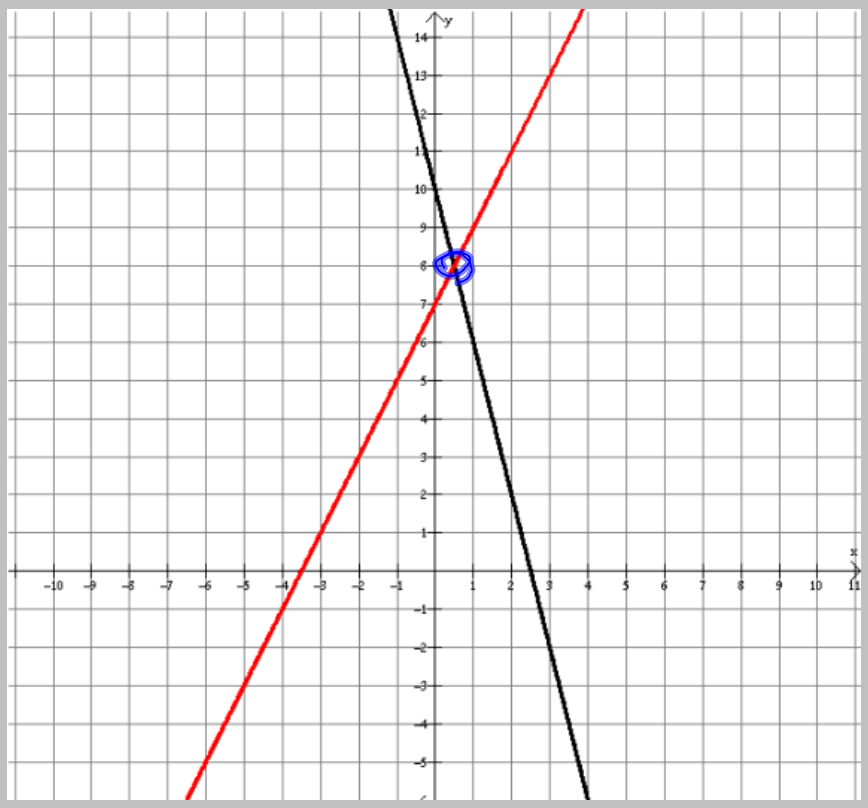
If we graph our 2 equations, we can check our answer....



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Example #2: Solve the following system of linear equations using the addition - subtraction method:

$x + 3y = 2$ AND $x - 2y = 2$

1. Line up the coefficients and variables
2. Multiply if required
3. Add/subtract
4. Solve
5. Replace solved value into equation

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Example #2: Solve the following system of linear equations using the addition - subtraction method:

$x + 3y = 2$ AND $x - 2y = 2$

1. Line up the coefficients and variables
2. Multiply if required
3. Add/subtract
4. Solve
5. Replace solved value into equation

$x + 3y = 2$

$-x - 2y = 2$

$5y = 0$

$y = 0$

$x + 3y = 2$

$x + 3(0) = 2$

$x + 0 = 2$

$x = 2$

$x - 2y = 2$

$x - 2(0) = 2$

$x - 0 = 2$

$x = 2$

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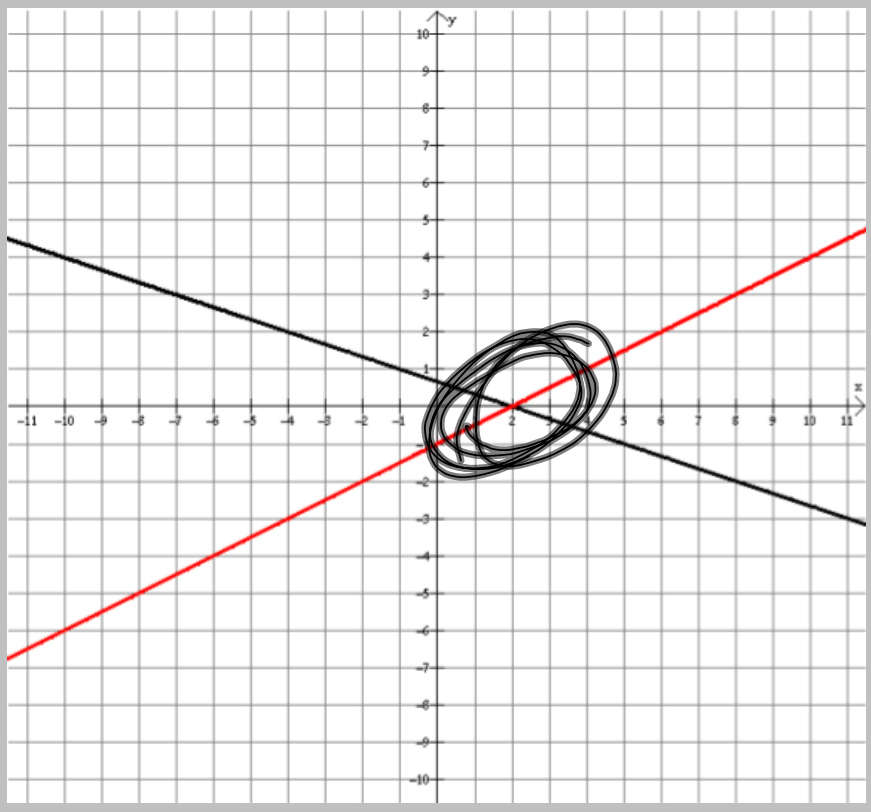
If we graph our 2 equations, we can check our answer....



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Example #3: Solve the following system of linear equations using the addition - subtraction method:

$3x + y = 2$ AND $5y + 20x = 50$

1. Line up the coefficients and variables
2. Multiply if required
3. Add/subtract
4. Solve
5. Replace solved value into equation

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Example #3: Solve the following system of linear equations using the addition - subtraction method:

$3x + y = 2$ AND $5y + 20x = 50$

1. Line up the coefficients and variables
2. Multiply if required
3. Add/subtract
4. Solve
5. Replace solved value into equation

$(3x + y = 2) \times 5$

$-\ 20x + 5y = 50$

$15x + 5y = 10$

$-\ 20x + 5y = 50$

$\frac{-5x}{-5} = \frac{-40}{-5}$

$x = 8$

$3x + y = 2$

$3(8) + y = 2$

$24 + y = 2$

$y = -22$

$(8, -22)$

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